

Foam-in-Place Contaminant Containment System, Phase I

Completed Technology Project (2009 - 2009)



Project Introduction

Over the next few decades, NASA plans to launch a number of planetary probes to and return the samples to Earth for detailed investigation. Due to the rapid expanse of space exploration, a need has been identified for the proper handling of extraterrestrial samples. Not only must the sample return system maintain the physical integrity of the sample in sometimes rigorous conditions (e.g., rover driving loads, diurnal temperature fluctuations, cruise, atmospheric entry and impact), it must address potential contamination issues. The samples themselves can become contaminated and they also present a serious contamination danger to the Earth. Therefore, the highest possible level of precaution must be exercised when handling the outer space samples until there are studies proving them harmless. In this Phase I project, we are proposing a "foam-in-the-capsule" system for containing and encapsulating samples of extraterrestrial material to be returned to Earth for detailed study. The system will eliminate or dramatically reduce the risk of contamination on flight hardware and ease the handling of the sample on the spacecraft, in landing, and in the process of sample transfer to the appropriate facility for investigation. The "foam-in-the-capsule" system combines the effectiveness of encapsulation and flexibility to improve design according to new scientific data or changes in the capsule carrier's interior. The proposed system consists of a compliant outer restraint based upon the DoverPac

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system for containment of potent pharmaceutical powders and a foam-in-place encapsulation process. The decontamination foam will be effectively sealed within the inflatable polymer capsules. The dimensions of the capsules are variable to fit the dimensions of the sample to be encapsulated. Sterilization of the encapsulated sample container before opening through the incineration of the foam encapsulant is possible.



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission
Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

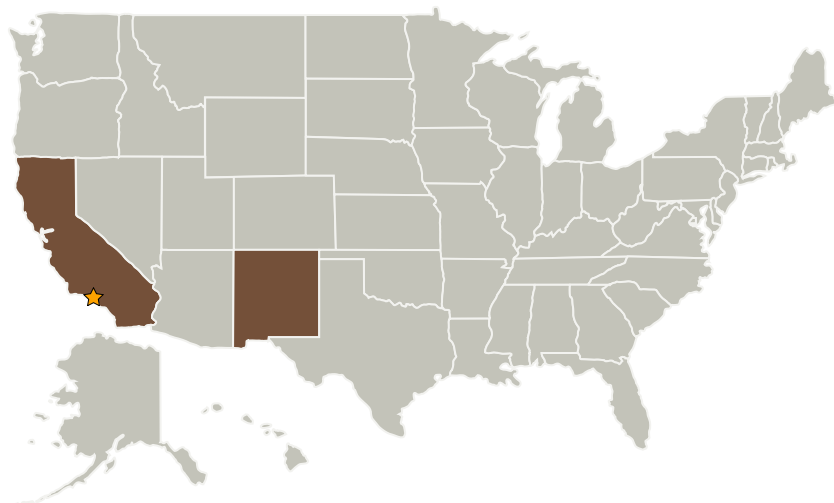
Small Business Innovation
Research/Small Business Tech
Transfer

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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory (JPL)	Lead Organization	NASA Center	Pasadena, California
Adherent Technologies, Inc.	Supporting Organization	Industry	Albuquerque, New Mexico

Primary U.S. Work Locations

California	New Mexico
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.3 In-Situ Instruments and Sensors
 - └ TX08.3.3 Sample Handling